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Historic plaster exposed

What You Never Knew You Wanted to Know About Plaster

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Not all plasters are created equal. The answers to the common questions below will give you a small foundation on which to hone your plaster knowledge. This foundation will help you to avoid common mistakes, which can shorten the life of your historic materials. It will also help you understand why and how you should keep and maintain your original plaster. Then you can amaze all your friends and help them save their plaster too.

What is plaster?

Plaster is a material composed of a binder, aggregate and additives to create a surface coating. The binder is what holds the mixture together. In the traditional buildings of New Orleans, the binder is typically lime putty, the aggregate is sand, and animal hair is a common additive used for strengthening the mix. Water is used to activate the binding qualities of the lime.

What is stucco?

Stucco is a term that has become popular for describing exterior plaster. It not only provides a decorative surface, but also can be a source of protection for underlying masonry.

What is lime?

Lime is made from heating limestone or shells to create a powder called quicklime. Quicklime is a volatile substance when mixed with water. Hydrated lime has just enough water to retain its powder form and still be nonvolatile. Quicklime or hydrated lime mixed with enough water to form a paste is called lime putty. The traditional way to make lime putty is directly from quicklime, but hydrated lime is often used today as a shortcut.

Where can plaster be applied?

Plaster can be used on interior wall and ceiling surfaces prepared with "lath." It can also be applied directly to interior or exterior masonry surfaces without a lath system.

What is lath?

Historic lath is a series of thin wooden strips nailed to the wall framing. It is an ideal surface because it provides a "key" to lock the plaster in place. (See Figures 1 and 2 for a depiction of a key.) Modern lath is metal or perforated gypsum board. Metal wire lath provides more keys but is very susceptible to rust. Gypsum board is popular today because it can be easily installed in sheets, but it is prone to moisture damage and mold because it is partially composed of paper.

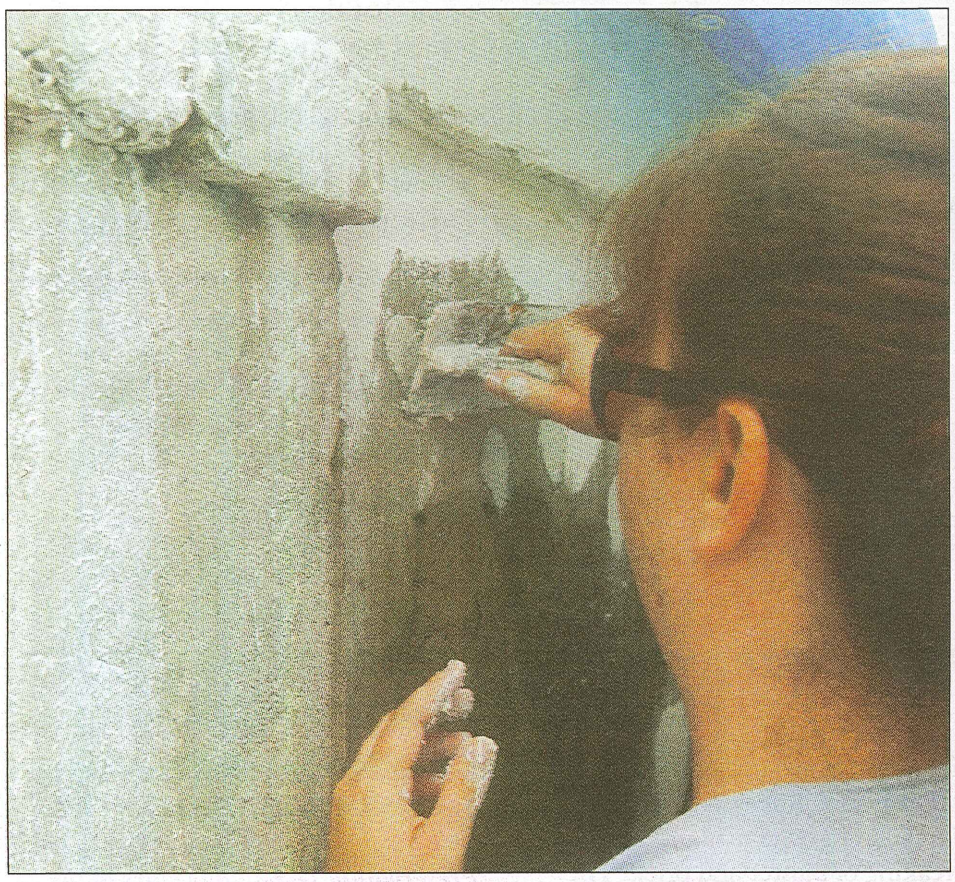

Photo by Jessica Cleaver

Conservation assistant Erin Edwards, of Chaux Vive Historic Preservation and Architectural Conservation Services, applies plaster patches to Reese Tomb at Lafayette Cemetery No. 1 in New Orleans.

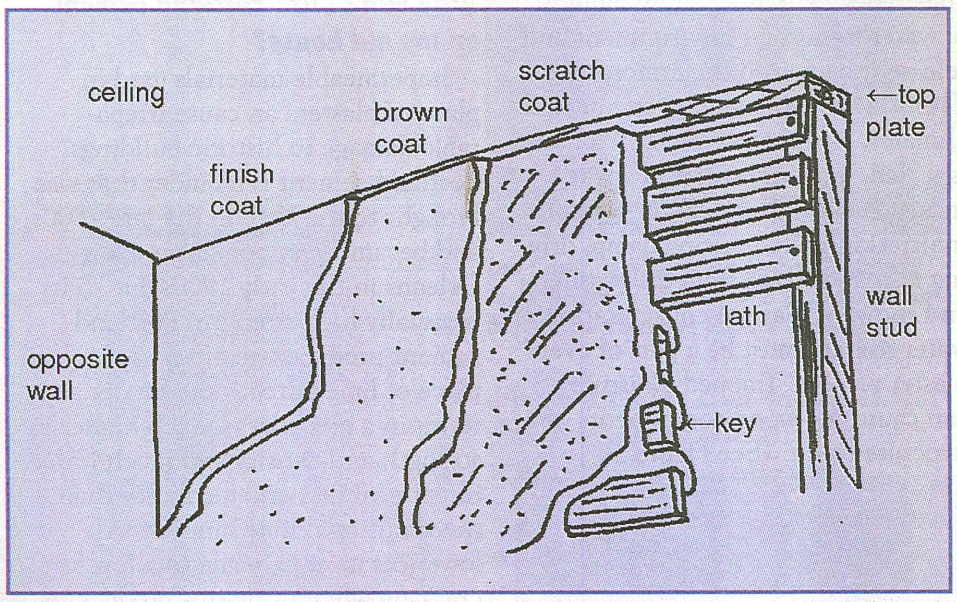

Figure 1. Face of wall with exposed plaster layers

How is traditional plaster applied?

Traditional plaster is applied in three coats: a scratch coat, a brown coat and a finish coat. The first two coats are a coarse mix of lime putty, aggregate, water and animal hair. Proportions vary based on the strength and finish desired. An example of a traditional base mix usually contains two parts water, one part lime putty, one part animal hair, and two parts sand. The first coat, which is called the scratch, creates a stable base for the next two layers and forms a stiff mechanical bond with the keys. It is spread about 3/8 of an inch thick onto a wetted lath surface and crosshatched to form the next mechanical bond. The second coat, or brown coat, is 1/2 to 3/4 inch thick and has an even but rough surface. The brown coat is similar to the scratch but contains about three parts sand and half as much hair as the scratch coat. A sample finish coat is about one part lime, two parts fine sand, and no hair. This last coat, the finish coat, can be applied in one or two applications, each about 1/8 inch thick. The finish coat is carefully troweled to create the smooth surface everyone is familiar with. (See Figures 1 and 2 for a depiction of these plaster layers.)

To avoid separation and damage, any patches on historic plaster should use a composition and thickness similar to the existing material. The mix proportions given above are for informational purposes only. Before attempting repairs, your plaster should be evaluated by a professional to determine the proper mix for your project. Also, some plasters are composed of two coats instead of three (with the brown coat being omitted).

Do not apply modern plaster compositions to historic surfaces. The proper way to fill cracks in original plaster is with lime putty. Not all joint compounds will bond to plaster, and they can affect the plaster's

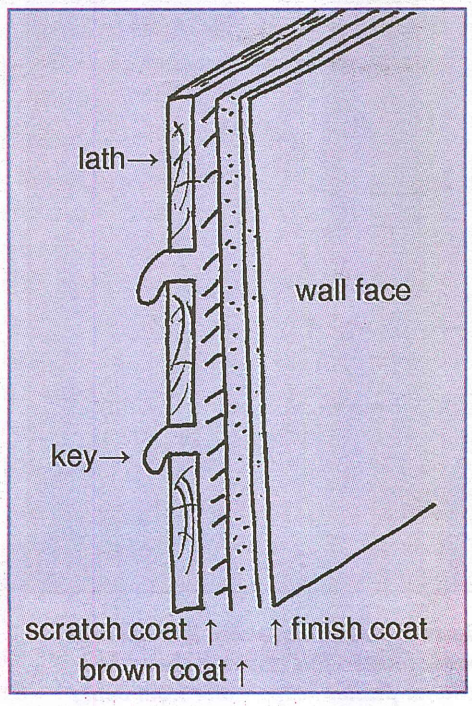

Figure 2. Cross-section of wall

Photo by Jessica Cleaver

Erin Edwards mixes brown coat plaster.

breathability. It is also important for a professional to ensure that the coats are not too thick and that curing time is sufficient so that no cracking or separation will result.

Why is traditional plaster so important in Louisiana?

Lime-based plasters are breatheable. They take in a certain amount of water from their environment and release it back into the atmosphere. This is a desirable quality in hot, wet climates. No matter how well a house is sealed, moisture will find a way inside. Potential sources for water infiltration include rising damp, driving rain and steam from dishwashers and showers. Careful consideration of water sources must be a part of every plaster project. Trapped moisture can cause the wood components of a structure to rot. (See Figure 3)

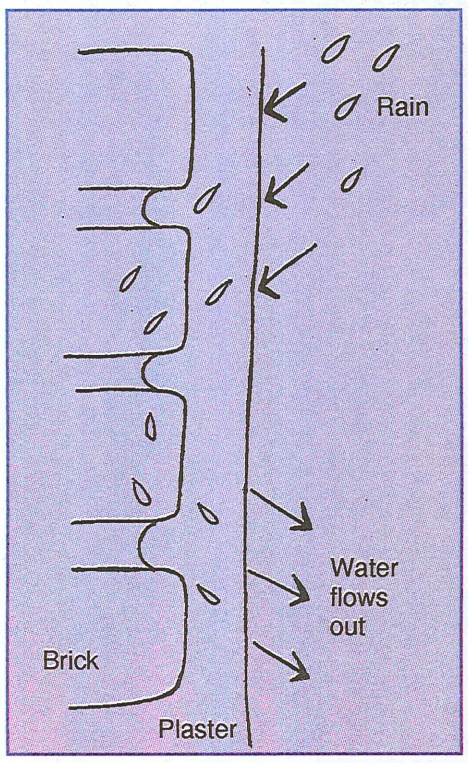

Figure 3. Water movement through lime-based plaster. This drawing shows how exterior plaster keeps water from being trapped in a brick wall.

Before plaster application, the surface should be dampened so that the surface material will not draw out the plaster's moisture. Each coat requires ample curing time and should be misted on a daily basis to allow a slow cure. If the material dries too fast, it will crack.

Why can't I use Portland cement on my old house?

Impermeable materials used in place of plaster can cause irreparable damage to historic buildings. Portland cement is a binder that was brought to the U.S. in the late 1800s and became very popular in New Orleans in the early 1900s due to its unusually high strength. Portland cement products are often used in place of lime putty as the binder and result in a mix that is much higher in strength and density and much lower in permeability and flexibility than the traditional lime mixture. Allowances must be made to allow for cracking when using this product, as Portland cement will always crack.

Figure 4 depicts how a Portland coating can cause damage by sending water farther into the wall. If the water is not allowed to escape through the brick face, it can find its way to vulnerable wood members and cause rot. It can also force its way out through the brick, taking some of the brick surface with it. Anything applied to the brick surface should be as soft or softer and as permeable or more permeable than the brick itself.

How do you "paint" traditional plaster?

The proper way to pigment a traditional plaster surface is with limewash. It is composed of lime putty, water and pigment. Whitewash is limewash that does not include pigment. Traditional limewash is ideal for pigmenting because it has the same traits as traditional plaster: it is breatheable, it expands and contracts with the plaster, and it can fill in plaster cracks.

Limewash requires regular maintenance to take advantage of its protective qualities and rich colors. Limewash requires an initial five to 10 coats, an additional one to two coats every year for the first five years, and a coat every two to three years thereafter. Eventually treatments can wait five to 10 years in between. A yearly inspection of mortar, stucco, masonry piers, and the roof of a historic home will keep problems at bay and help to determine a regular maintenance schedule.

Other options for coloring plaster include casein paints and limepaint. Casein paints are milk-based, historically appropriate paints that are primarily used on interior plaster. A limepaint is a limewash with 3 to 5 percent acrylic paint added. It is intended for use on Portland surfaces to help it stick to the surface because limewash does not bond well to Portland. Local architectural and conservation firms can make and apply these appropriate treatments and can conduct the yearly materials inspections.

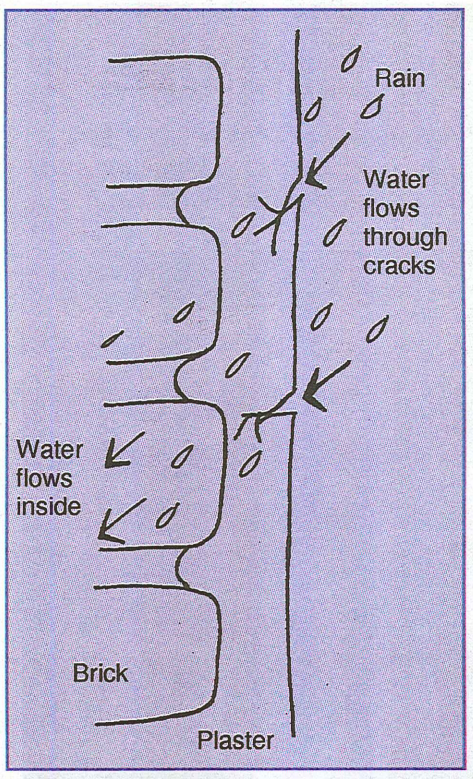

Figure 4. Water movement through Portland-based plaster

Why can't I use regular paint?

Impermeable finishes like latex or elastomeric paints used in place of limewash, limepaint or casein paint will trap moisture and result in bubbling paint and contribute to the breaking of plaster and brick. The same is true for modern waterproofing coatings marketed especially for brick.

Why should I save my plaster?

Lime-based plaster is more durable and has a much longer life than sheetrock. Lime comes from stone, while sheetrock is made in part from paper. Plaster can survive numerous floods while sheetrock is ruined immediately and easily grows mold. Plaster is a more high-end, valuable material than sheetrock. Original plaster often gives the average homeowner an asset they could never afford to install from scratch. Ornamental plaster has even more value and is sometimes irreplaceable due to a decline in the number of highly skilled craftsmen trained to do this work. Also, given its natural insulating qualities, it keeps your house cooler.

Exterior plaster is used as a natural water barrier that will help to keep moisture out of your house. It can also be considered a form of repair on masonry structures. It has the ability to shield the building from moisture without trapping it. Maintenance will be required to keep the plaster in good shape, but this maintenance will save you from more expensive brick repairs.

What do I look for in a plaster contractor?

When considering contractors for traditional plasterwork, it is important to ensure that they are well informed about historic methods and materials. Many contractors claim that they are experienced in historic repairs just because they have done work on old houses. This does not mean that they have done proper repairs. Ask questions, but be sure not to ask leading ones. For example, ask what mix they use for stucco or plaster, how many coats they apply, or how long they allow the plaster to cure between each coat.

These answers have provided just a glimpse into the exciting world of plaster. There is plenty more to learn. You can start by accessing the National Park Service Preservation Briefs at http://www.nps.gov/history/hps/tps/briefs/presbhom.htm. Briefs 1, 2, 21, 22, 23 and 39 all relate to problems concerning plaster.

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